II. REMARKS

In the Office Action, claims 1, 2 and 3 were rejected under 35 U.S.C. 102 as being anticipated by Yoshino (US 5537443) for reasons set forth in the Action. Claims 4-26 were rejected under 35 U.S.C. 103 as being unpatentable over Yoshino in view of Kubo (US 6556632) for reasons set forth in the Action.

The following argument is presented to show the presence of allowable subject matter in the claims presented for reconsideration without amendment, thereby to overcome the rejections under 35 U.S.C. 102 and 103.

It is noted that the present invention introduces an improvement to the traditional Viterbi-algorithm or a reduced trellis search algorithm. In the improved algorithm, transition metrics also take into consideration selected future terms, not only current moment and history terms, as in the traditional Viterbi-algorithm used by Yoshino.

Yoshino uses the traditional Viterbi-algorithm as such as a part of his method. Yoshino does not teach any modifications to the Viterbi-algorithm. Therefore, a person skilled in the art would not have looked to Yoshino for improving reduced trellis search algorithms. The person skilled in the art would not have achieved the teachings of the present invention on the basis of Yoshino.

Therefore, it is believed that the present claims distinguish the present invention from the teachings of Yoshino. In the case of those claims rejected over the combined teachings of Yoshino with Kubo, Kubo is used to show additional subject matter

presented in the dependent claims, but does not change the basic teaching of Yoshino, as applied to present claim 1, as may be appreciated from the following analysis.

Yoshino relates to an interference signal canceling method and a receiver thereof, where degradation of transmission characteristics due to co-channel or similar interference signals from adjacent cells are compensated (column 1 lines 9 to 17).

Figure 3 of Yoshino, to which the Examiner refers, illustrates a receiver according to Yoshino that may be compared with the prior art example of Figure 1. Figure 3 shows an example of two received interference parts 20_1 and 20_2 and an error estimation part 30 which generates an estimation error signal by subtracting the estimated received desired signal and the estimated received interference signal from the received signal.

The state estimation part 40 generates a plurality of desired signal sequence candidates corresponding to a plurality of transition states of the desired signal. The state estimation part 40 also generates a plurality of interference signal sequence candidates corresponding to a plurality of transition states of each interference signal, and provides the candidates to the interference signal estimation parts 20_1 and 20_2.

The estimation error signal is obtained by comparing desired signal candidates and the interference signal candidates, and it is used to calculate the likelihood which in turn is used to estimate the desired signal sequence and the interference signal sequence.

Based on the estimation error signal and the desired and interference signal sequences, conversion parameters of the desired signal estimation part 10 and the interference signal estimation parts 20_1 and 20_2 are controlled. Accordingly, the channel impulse response is controlled (column 9, lines 29 to 67, and column 10, lines 1 to 3).

Figure 4, which the Examiner also refers to, illustrates a concrete configuration of the Figure 3 embodiment. In the Figure 4 embodiment, one interference signal contained in the received signal is cancelled. Also, the desired signal estimation part 10 and the interference signal estimation part 20 are formed by transversal filters 11 and 21. The error estimation part is made up of an adder 31, which adds the estimated received desired signal and the estimated received interference signal, and a subtractor 32, which subtracts the added output of the adder 31 from the received signal and outputs the estimation error signal.

The state estimation part 40 comprises: a likelihood calculation part 41 which calculates the likelihood from the estimation error signal; a maximum likelihood sequence estimator 42 which generates a signal sequence candidate corresponding to the state of transition of the desired signal and makes the decision of the desired signal sequence on the basis of the likelihood signal that is provided from the likelihood calculation part 41; and a maximum likelihood sequence estimator 43 which generates a signal sequence candidate corresponding to the state of transition of the interference signal and makes a decision of the interference signal sequence on the basis of the likelihood signal corresponding thereto (column 10, lines 14 to 36).

The desired signal maximum likelihood sequence estimator 42 sequentially generates all candidates for the signal sequence representing the state of transition of the desired signal and provides them to the modulated signal generating part 44 (column 14, lines 41 to 45). On the other hand, the interference signal maximum likelihood sequence estimator 43 sequentially generates all candidates for the signal sequence representing the state of transition of the interference signal and provides them to the modulated signal generating part 45 (column 14, lines 53 to 57).

Likelihood signals are obtained corresponding to respective combinations of desired and interference signal sequence candidates. Desired and interference signal sequence candidates of that combination which maximizes the likelihood of the likelihood signal are selected as desired and interference signal sequences (column 16, lines 34 to 45).

Yoshino teaches a method where desired signal sequence candidates, corresponding to transition states of the desired signal, and interference signal sequence candidates, corresponding to transition states of each interference signal, are generated.

Yoshino also discloses that the estimation error signal is obtained by comparing desired signal candidates and the interference signal candidates. This is used to calculate the likelihood which in turn is used to estimate the desired signal sequence and the interference signal sequence.

Yoshino further teaches that desired and interference signal sequence candidates of the combination maximizing the likelihood

of the likelihood signal are selected as desired and interference signal sequences.

Briefly, Yoshino teaches nothing about selecting at least one of the highest and/or most reliable impulse response values as the present specification discloses. The values selected for use among the impulse response values are either the highest values, which allows the received signal energy to be maximized, or the selection is made taking into account the reliability of the value as well. This may be accomplished, for example, by selecting perhaps a weaker impulse response value, if it is a very reliable one, and leaving out a value which is high but unreliable (claim 1, paragraph [0024]).

The present specification discloses, to the contrary of Yoshino, that a reference signal is determined using impulse response values and a symbol sequence assumed as transmitted.

The present specification also discloses that differential terms are determined corresponding to the selected impulse response values for a signal sample and a reference signal, not discussed by Yoshino. In the present invention, differential terms are, for instance, determined as a squared Euclidean distance by using samples of received signals corresponding to the impulse response values and reference signals (claim 1, paragraph [0031]). Again, this is not discussed by Yoshino.

Thus it appears that Yoshino fails to disclose various aspects of the present invention, and provides other teachings which are contrary to the practice of the present invention. The examiner, in the rejection of the claims, has drawn analogies between various elements set forth in the present claims and various

elements disclosed in the drawing figures of Yoshino. However, in view of the foregoing analysis, it appears that the attempted showing of correspondence, by the examiner, between the claim elements and the Yoshino figures does not defeat novelty of the present invention. Accordingly, it is believed that the present argument overcomes the rejections under 35 U.S.C. 102 and 103, and that the present independent claims 1 and 15, and their respective dependent claims, recite subject matter that is novel over the teachings of Yoshino, and are therefore patentable over Yoshino.

For all of the foregoing reasons, it is respectfully submitted that all of the claims now present in the application are clearly novel and patentable over the prior art of record, and are in proper form for allowance. Accordingly, favorable reconsideration and allowance is respectfully requested. Should any unresolved issues remain, the Examiner is invited to call Applicants' attorney at the telephone number indicated below.

The Commissioner is hereby authorized to charge payment for any fees associated with this communication or credit any over payment to Deposit Account No. 16-1350.

Respectfully submitted,

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